TO7280 "68T0h660

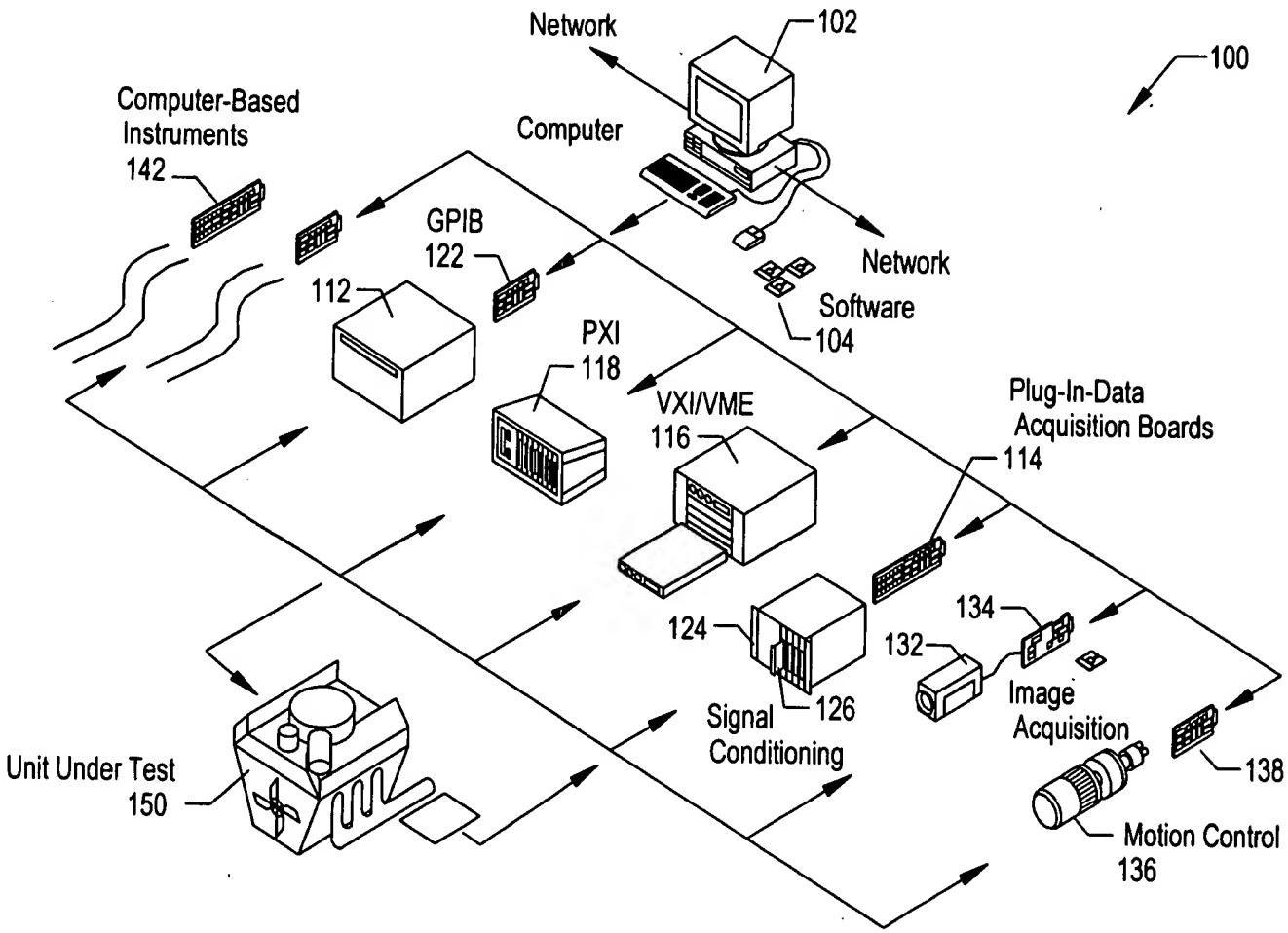

FIG. 1A

T07280"6870h660

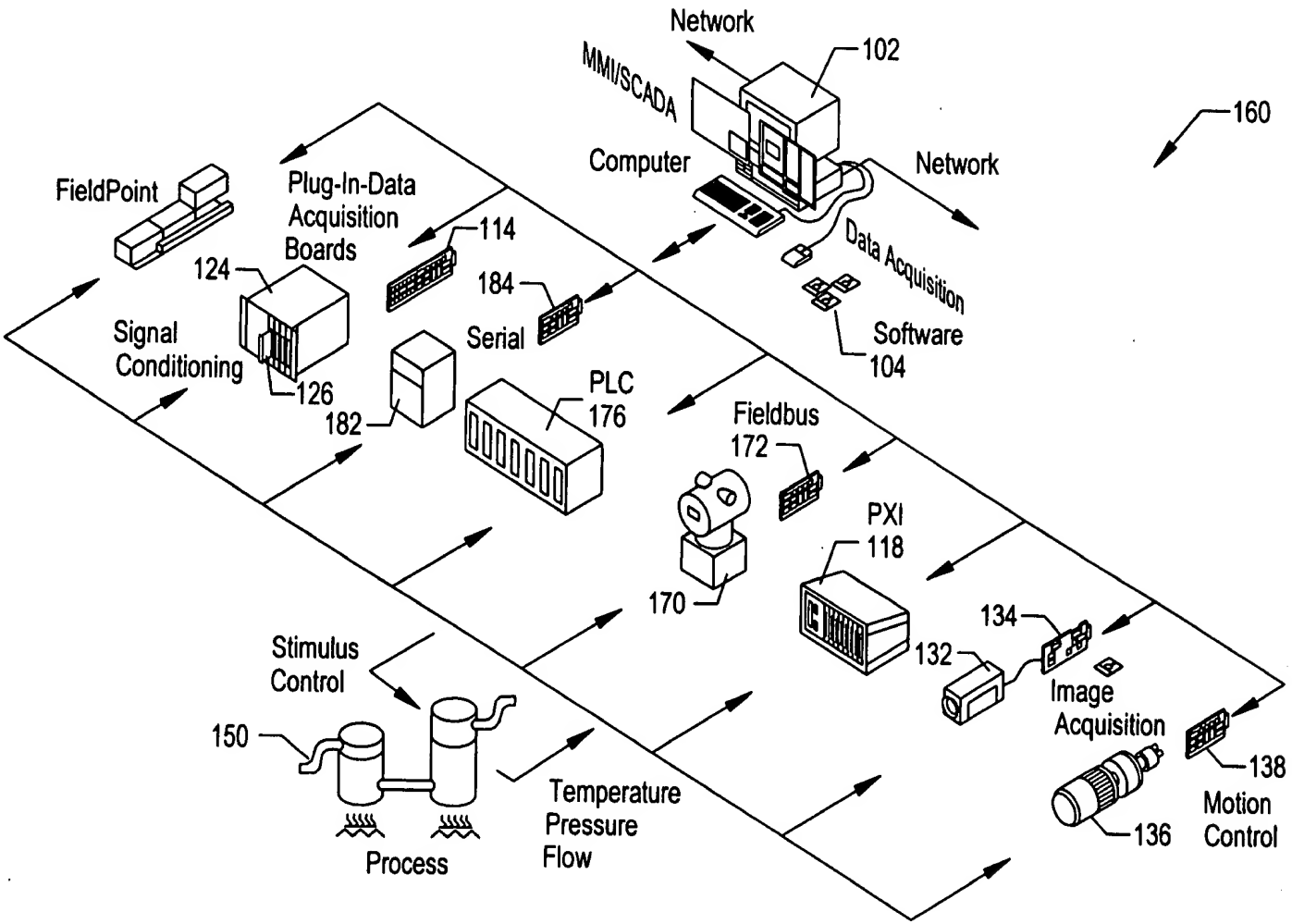

FIG. 1B

I0/280,681Oth660

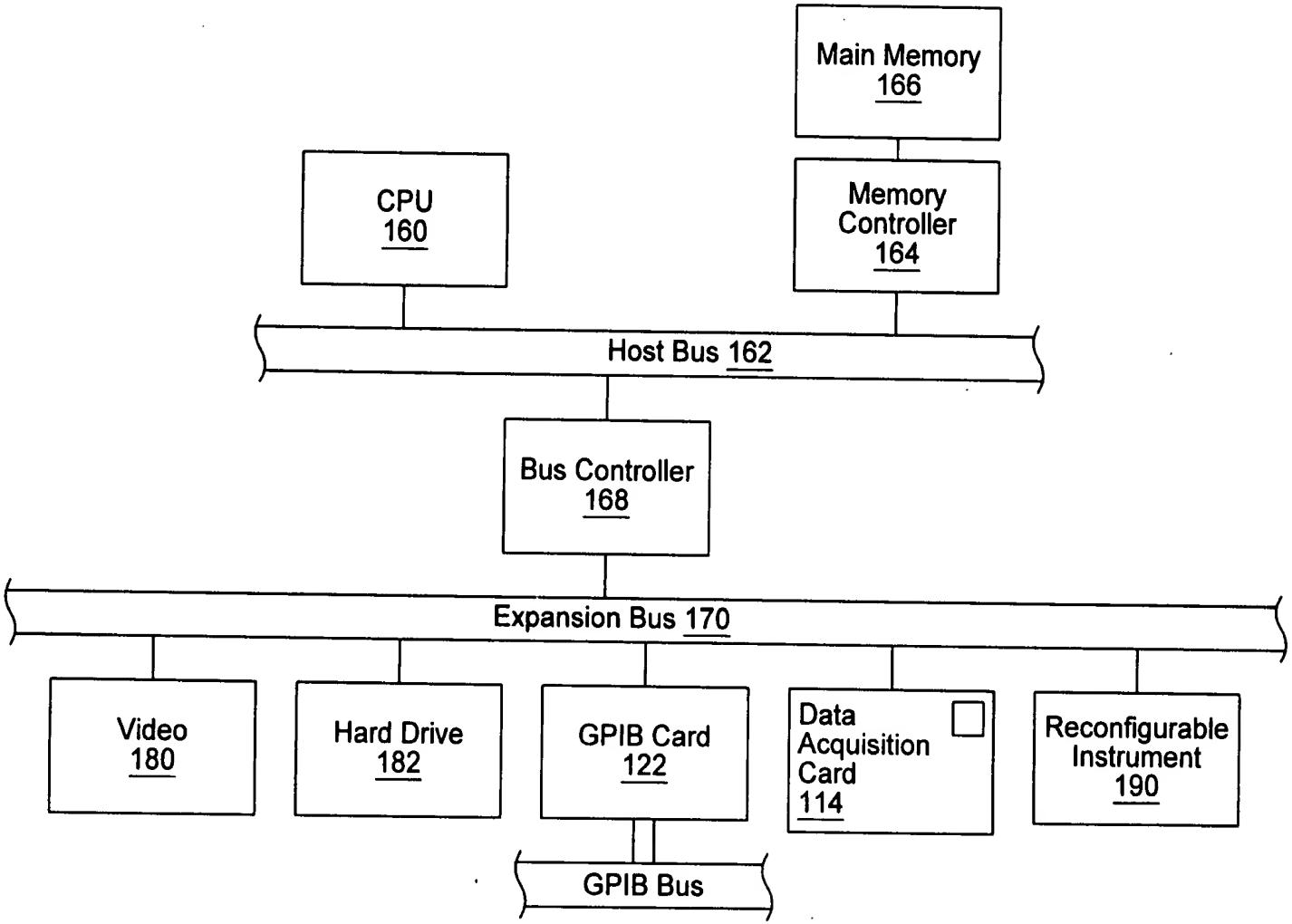

FIG. 2

10/2680 09/17/04 09:46:56

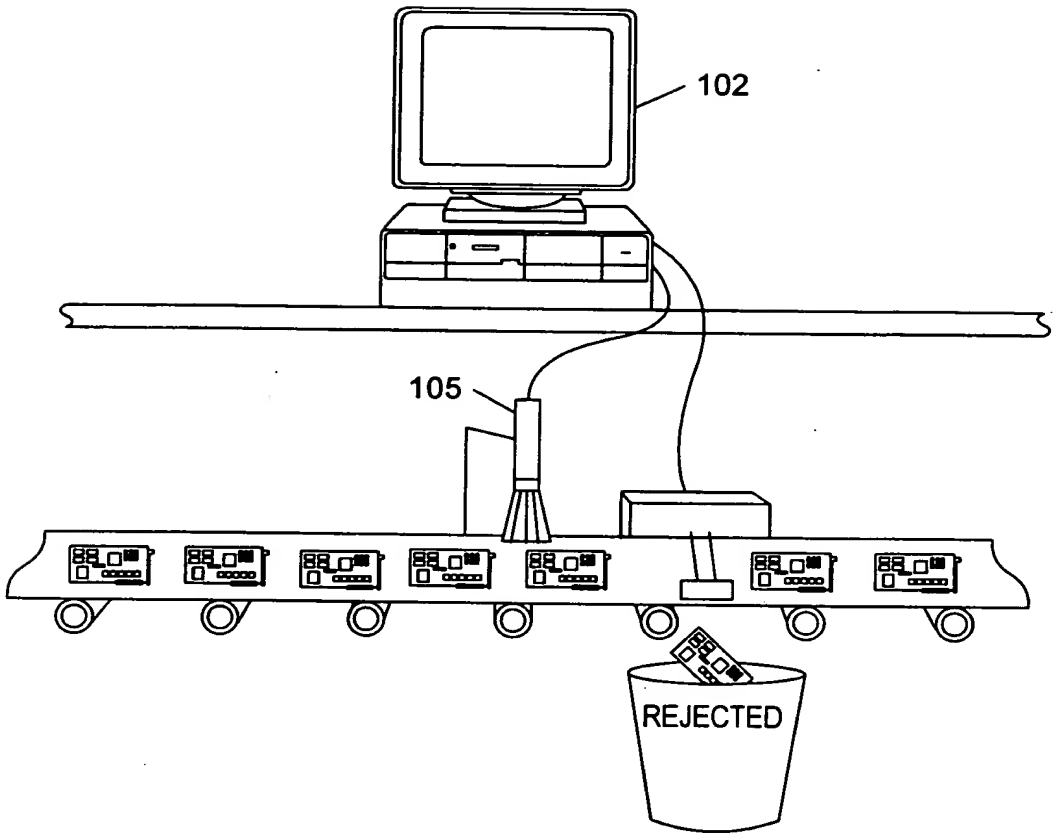

FIG. 3

Express Mail Label No. EV329004565US

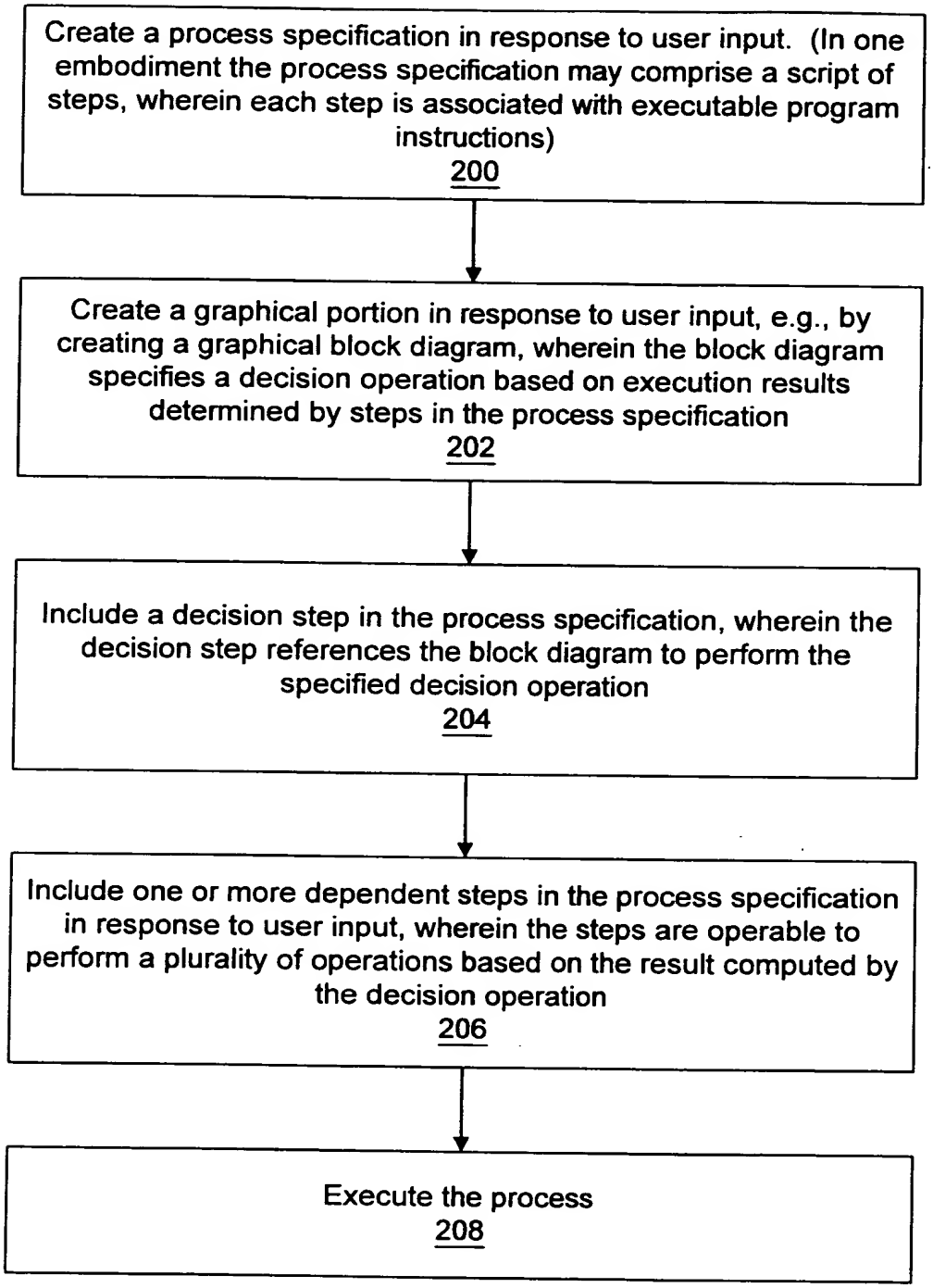

FIG. 4

T07280"6870H660

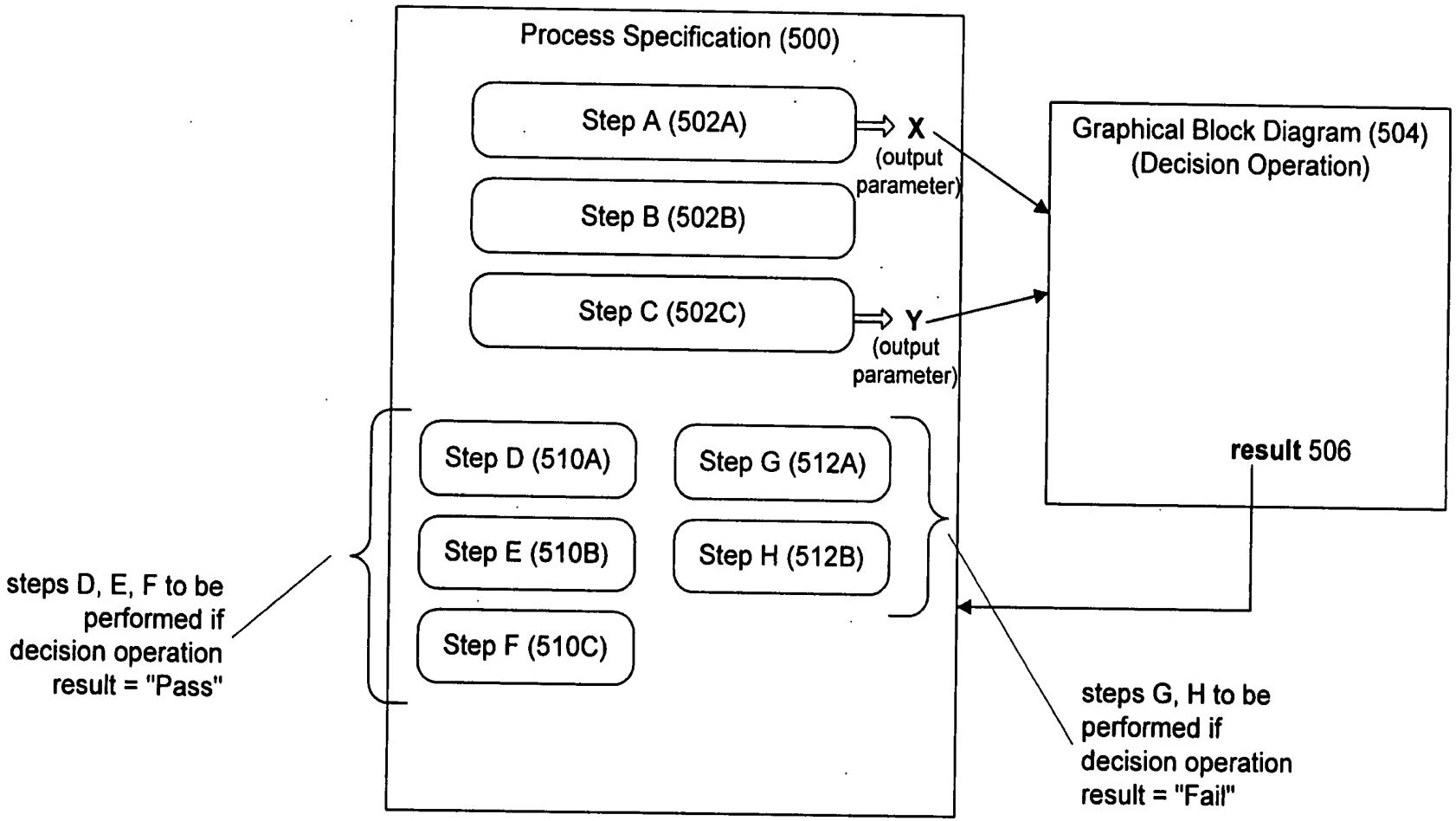

FIG. 5

EP 2 284 694 A1

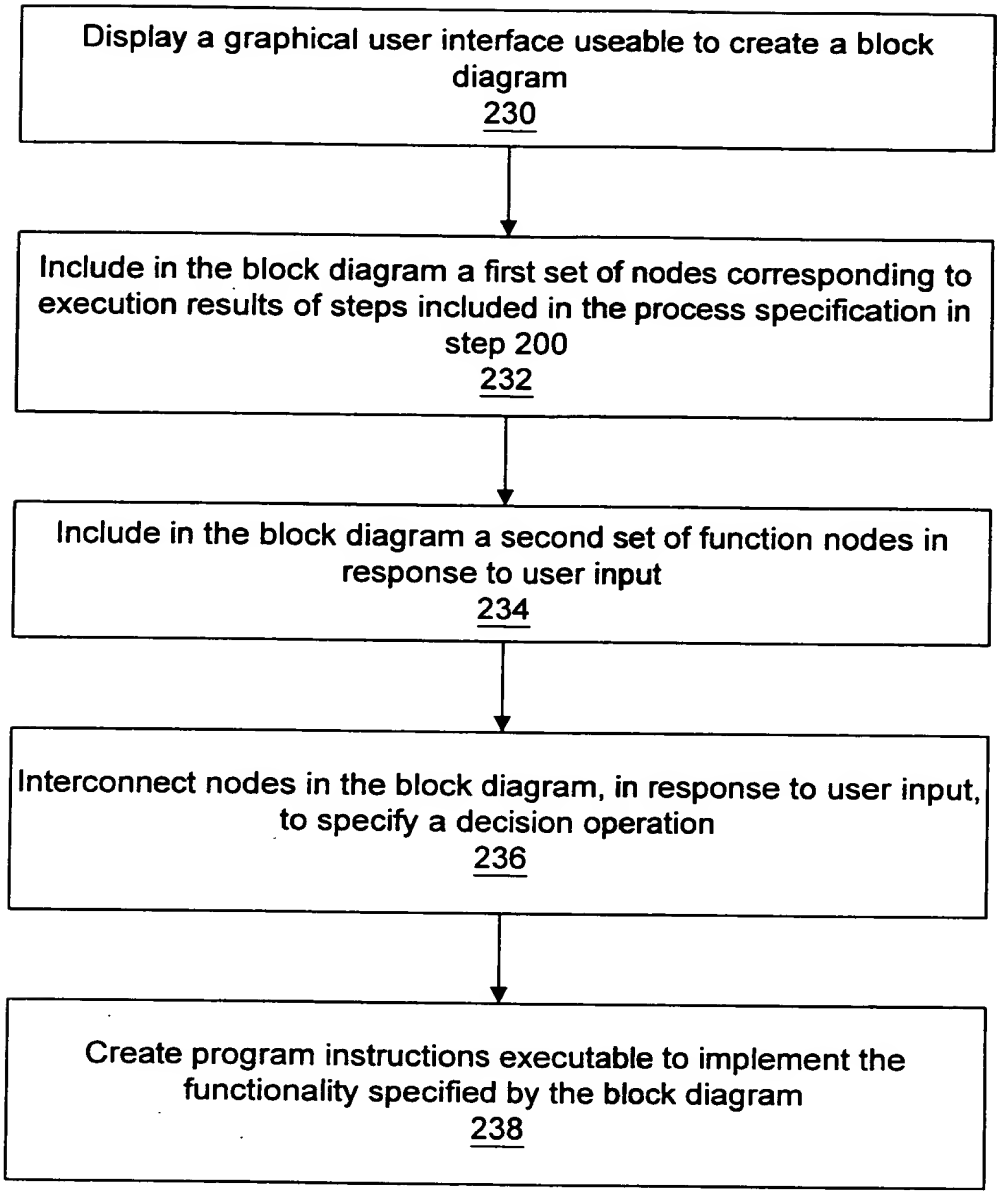

FIG. 6

U.S. Patent No. 6,950,548

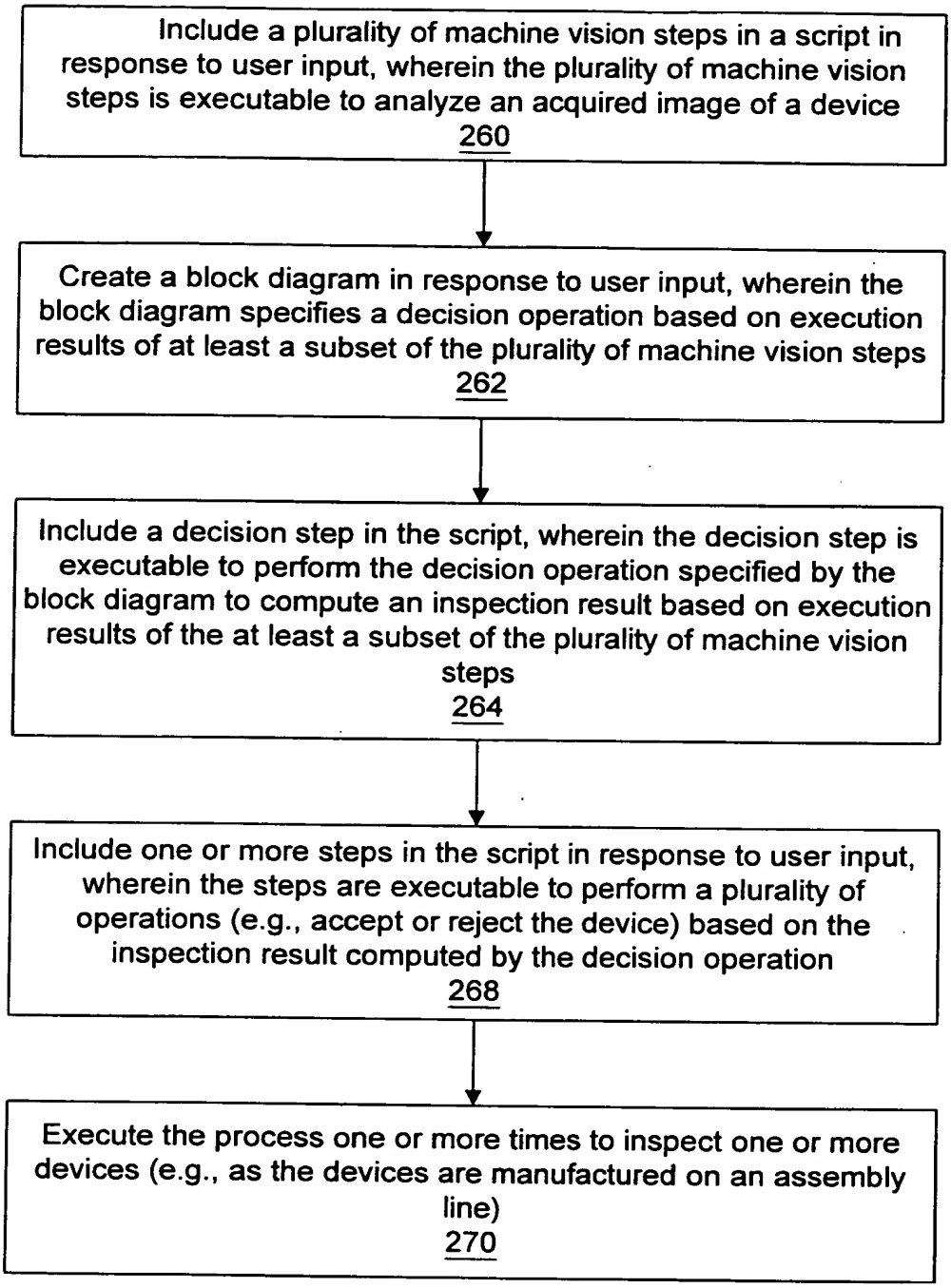

FIG. 7

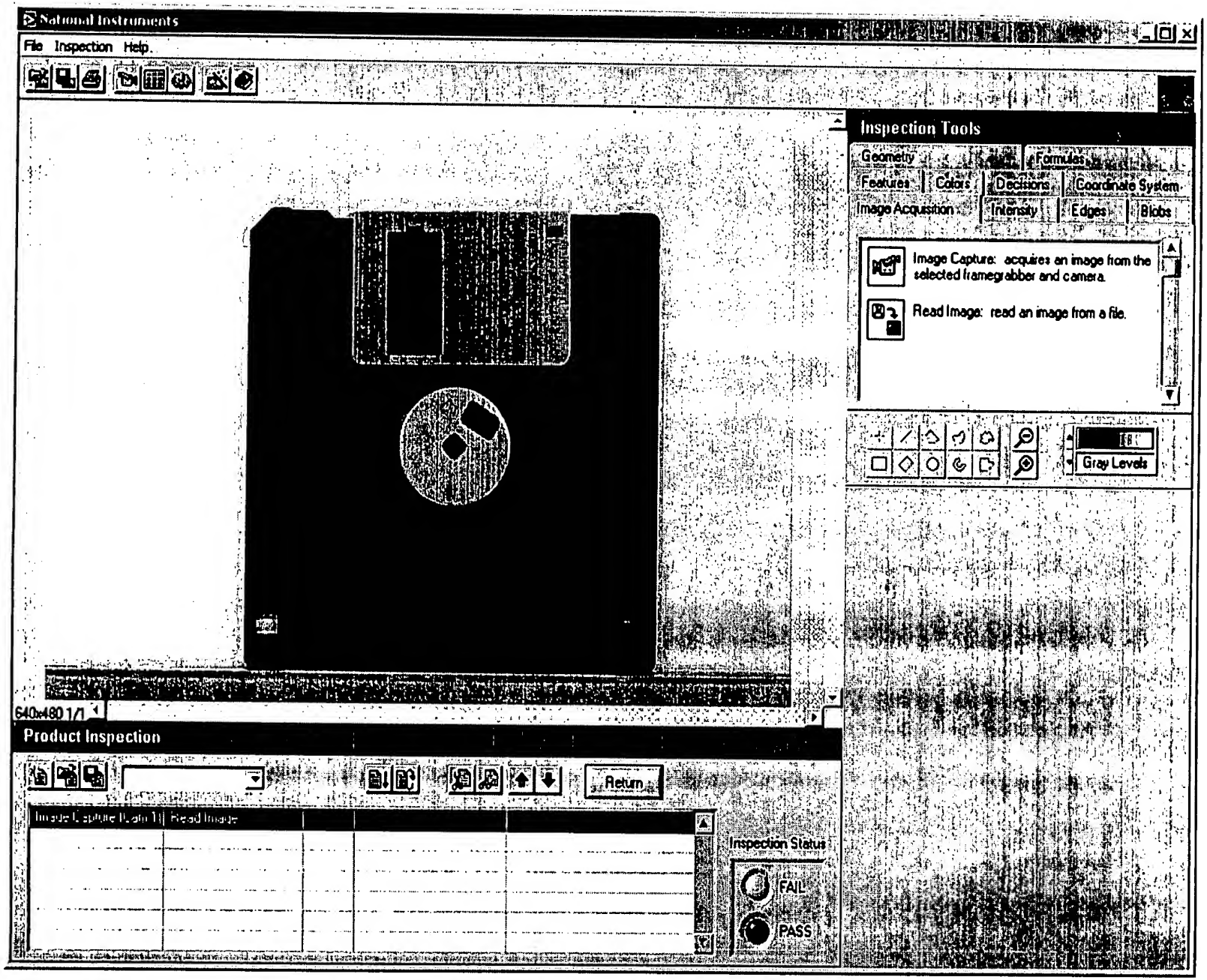
National Instruments
File Inspection Help
Inspection Tools
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Image Acquisition
Intensity
Edges
Blobs
Image Capture: acquires an image from the selected framegrabber and camera.
Read Image: read an image from a file.
Gray Levels
640x480 1/1
Product Inspection
Return
Inspection Status
FAIL
PASS

FIG. 8

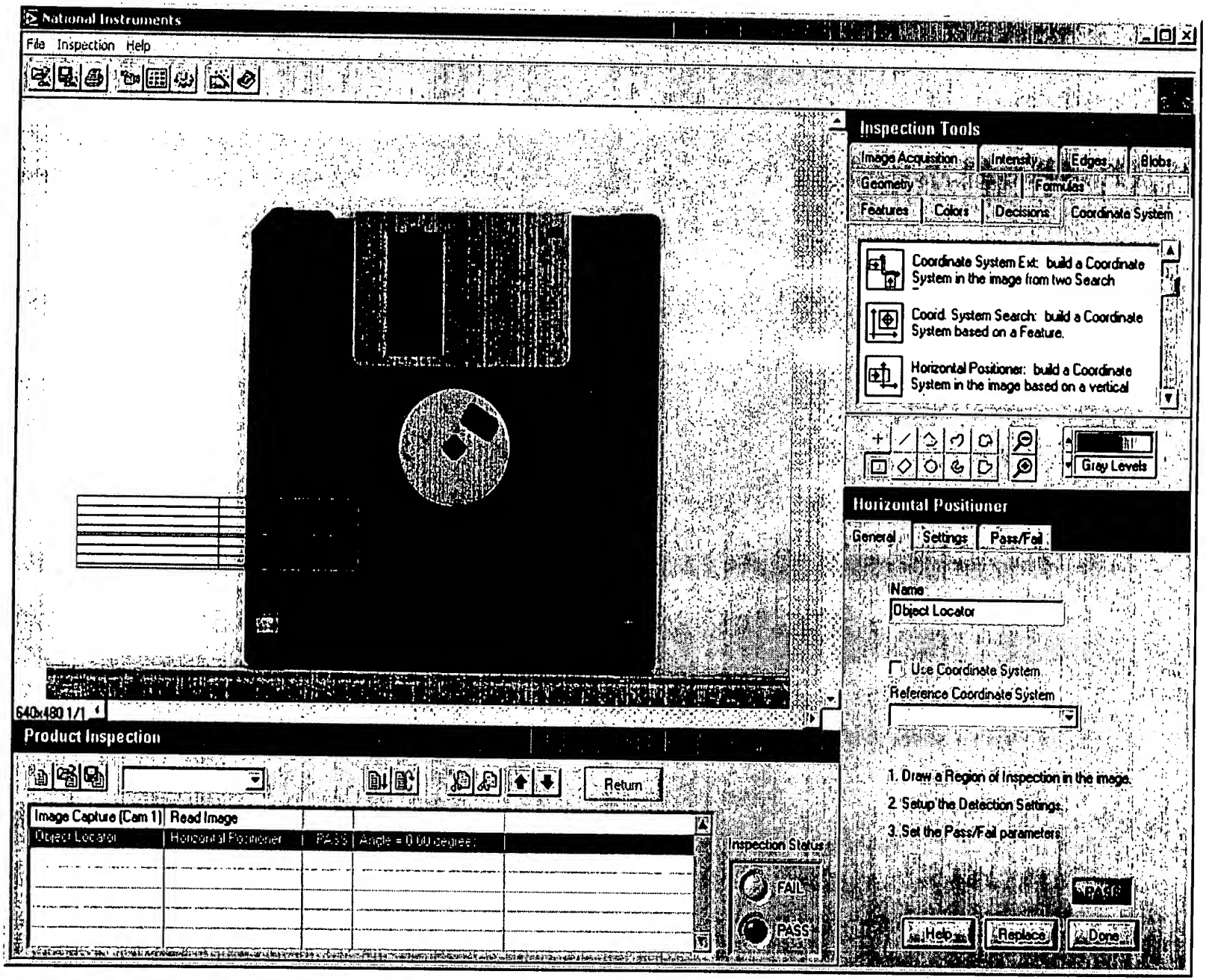
National Instruments
File Inspection Help
Inspection Tools
Image Acquisition
Intensity
Edges
Blobs
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Coordinate System Ext: build a Coordinate System in the image from two Search
Coord. System Search: build a Coordinate System based on a Feature.
Horizontal Positioner: build a Coordinate System in the image based on a vertical
Gray Levels
640x480 1/1
Horizontal Positioner
General
Settings
Pass/Fail
Name
Object Locator
Use Coordinate System
Reference Coordinate System
1. Draw a Region of Inspection in the image.
2. Setup the Detection Settings.
3. Set the Pass/Fail parameters.
Help
Replace
Done
Product Inspection
Return
Image Capture (Cam 1)
Read Image
Object Locator
Horizontal Positioner
PASS
Angle = 0.00 degrees
Inspection Status
FAIL
PASS

FIG. 9

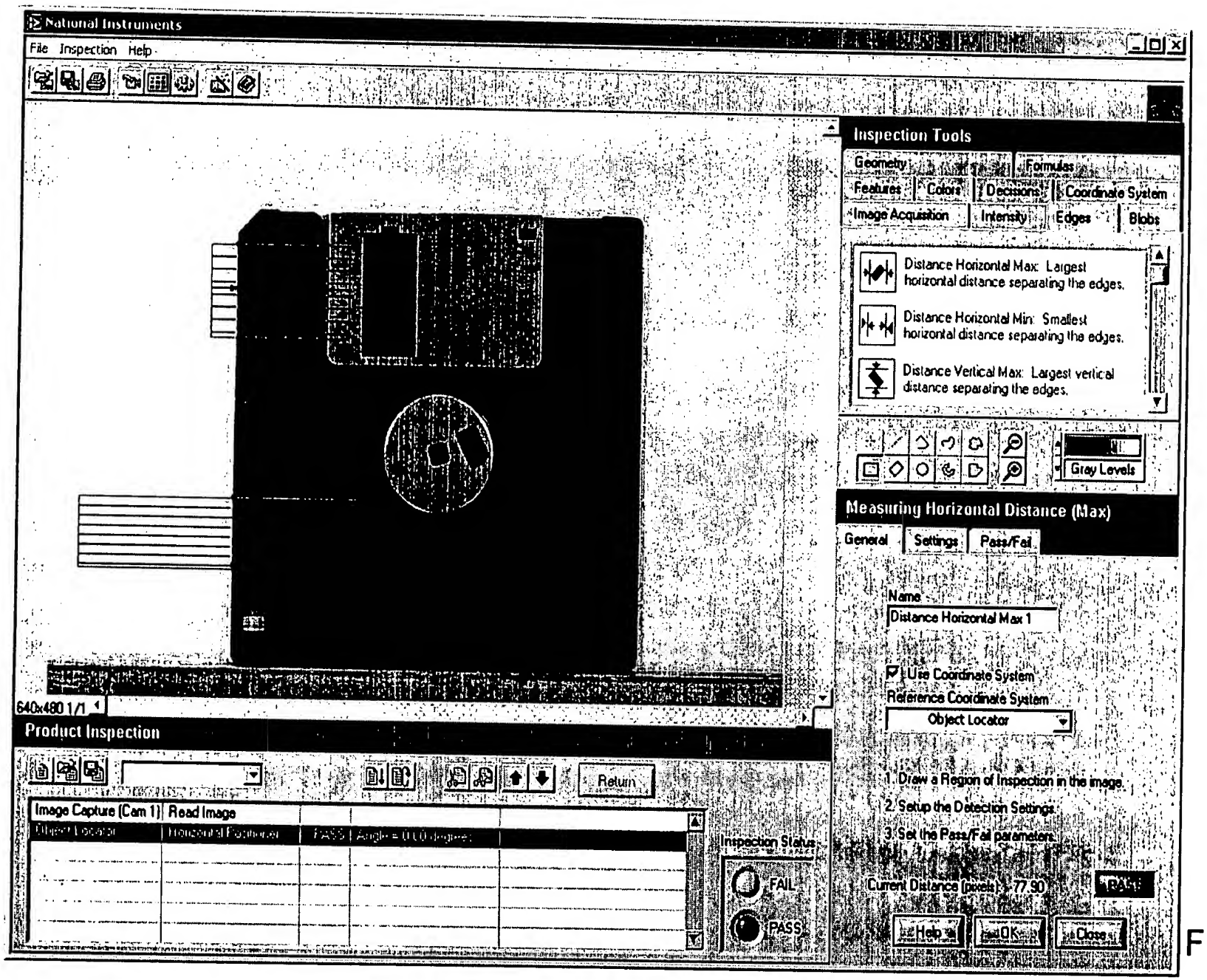
National Instruments
File Inspection Help
Inspection Tools
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Image Acquisition
Intensity
Edges
Blobs
Distance Horizontal Max: Largest horizontal distance separating the edges.
Distance Horizontal Min: Smallest horizontal distance separating the edges.
Distance Vertical Max: Largest vertical distance separating the edges.
Gray Levels
Measuring Horizontal Distance (Max)
General
Settings
Pass/Fail
Name
Distance Horizontal Max 1
Use Coordinate System
Reference Coordinate System
Object Locator
1. Draw a Region of Inspection in the image.
2. Setup the Detection Settings.
3. Set the Pass/Fail parameters.
Current Distance (pixels) = 77.90
Help
OK
Close
640x480 1/1
Product Inspection
Return
Image Capture (Cam 1)
Read Image
Inspection Status
FAIL
PASS

FIG. 10

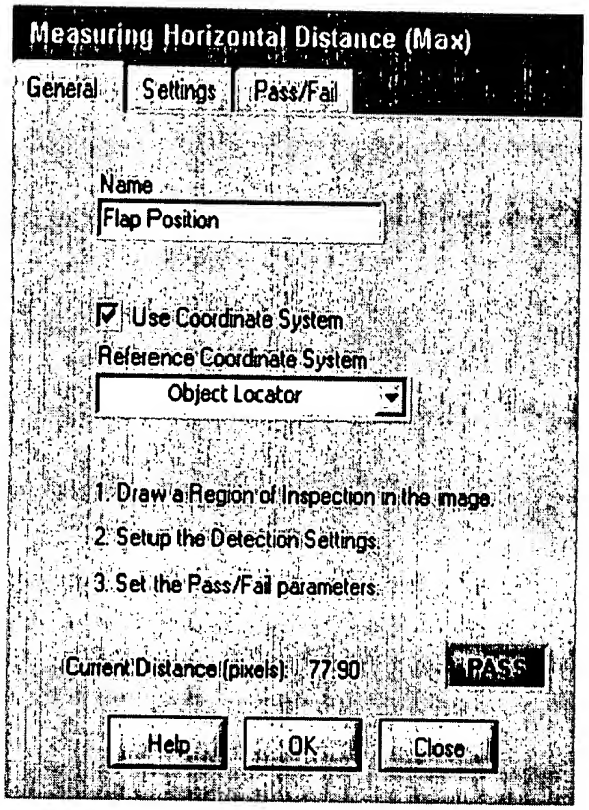
Measuring Horizontal Distance (Max)
General
Settings
Pass/Fail
Name
Flap Position
Use Coordinate System
Reference Coordinate System
Object Locator
1. Draw a Region of Inspection in the image.
2. Setup the Detection Settings.
3. Set the Pass/Fail parameters.
Current Distance (pixels): 77.90
PASS
Help
OK
Close

FIG. 11

T02280"6810h660

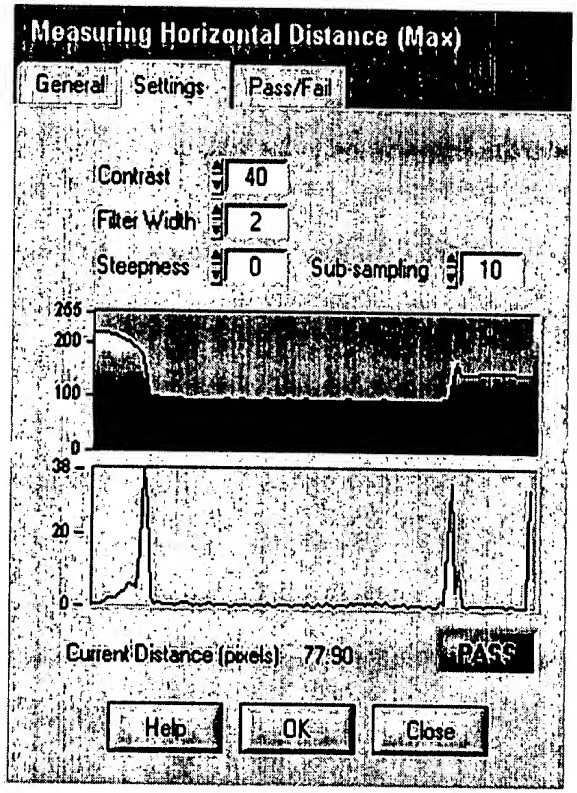

FIG. 12

TO2280 68T0h660

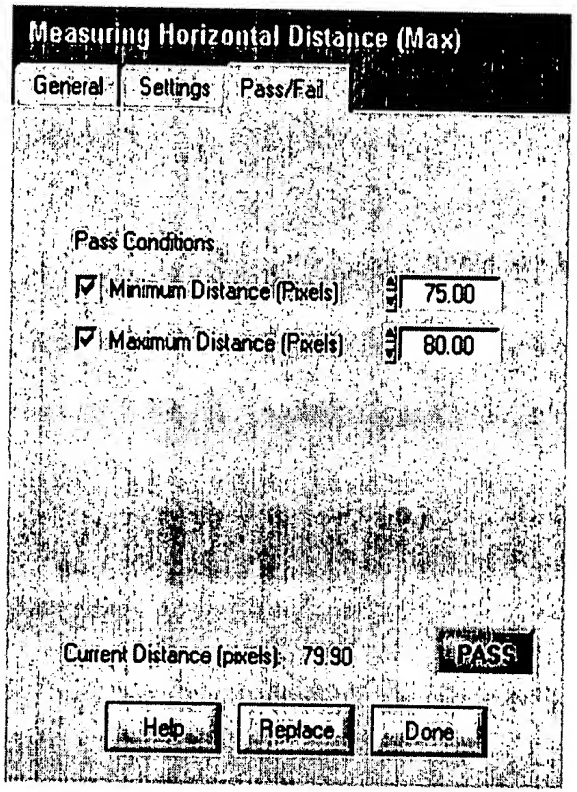

FIG. 13

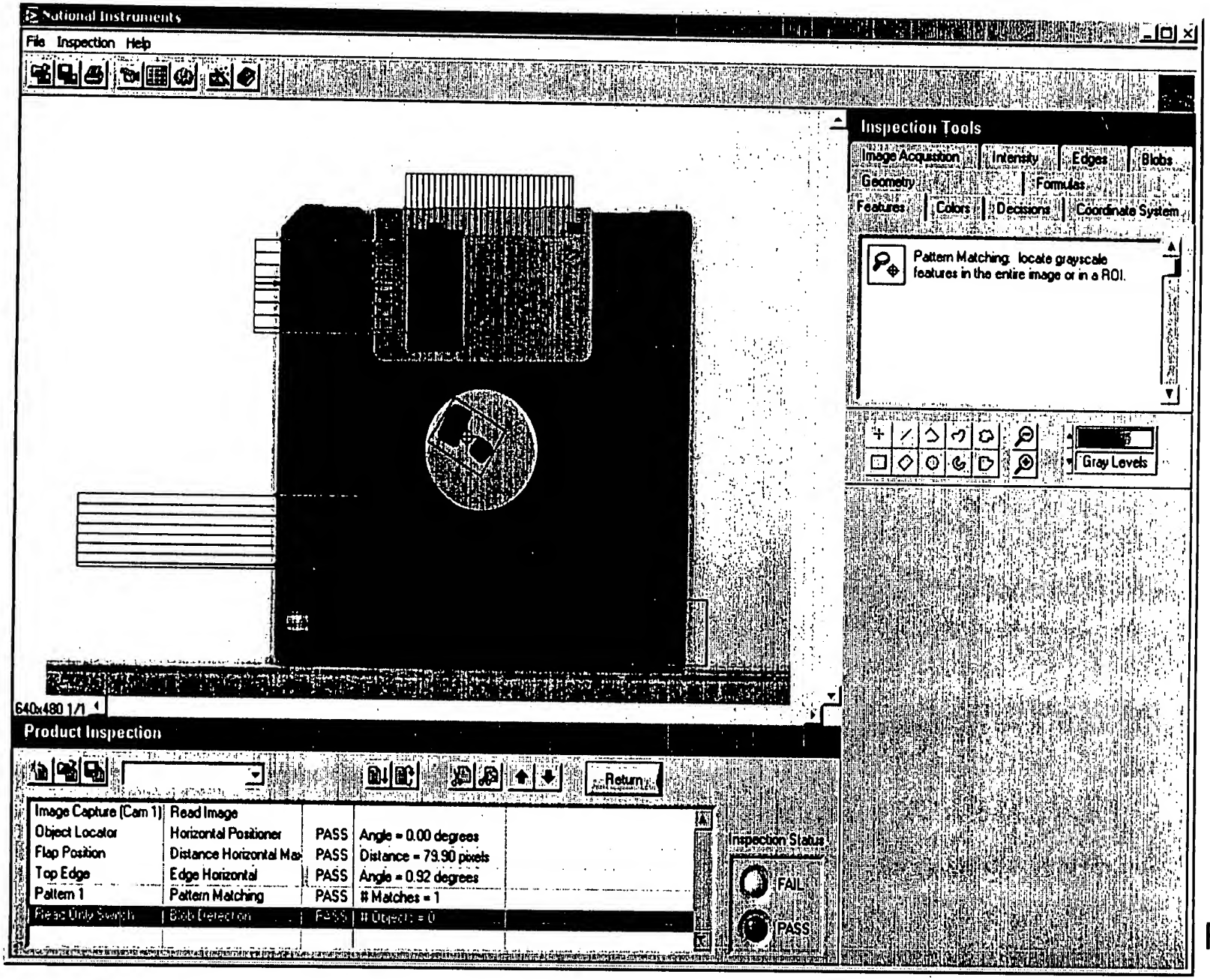
National Instruments
File Inspection Help
Inspection Tools
Image Acquisition
Intensity
Edges
Blobs
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Pattern Matching: locate grayscale features in the entire image or in a ROI.
Gray Levels
640x480 1/1
Product Inspection
Return
Image Capture (Cam 1) Read Image
Object Locator Horizontal Positioner PASS Angle = 0.00 degrees
Flap Position Distance Horizontal Max PASS Distance = 79.90 pixels
Top Edge Edge Horizontal PASS Angle = 0.92 degrees
Pattern 1 Pattern Matching PASS # Matches = 1
Inspection Status
FAIL
PASS

FIG. 14

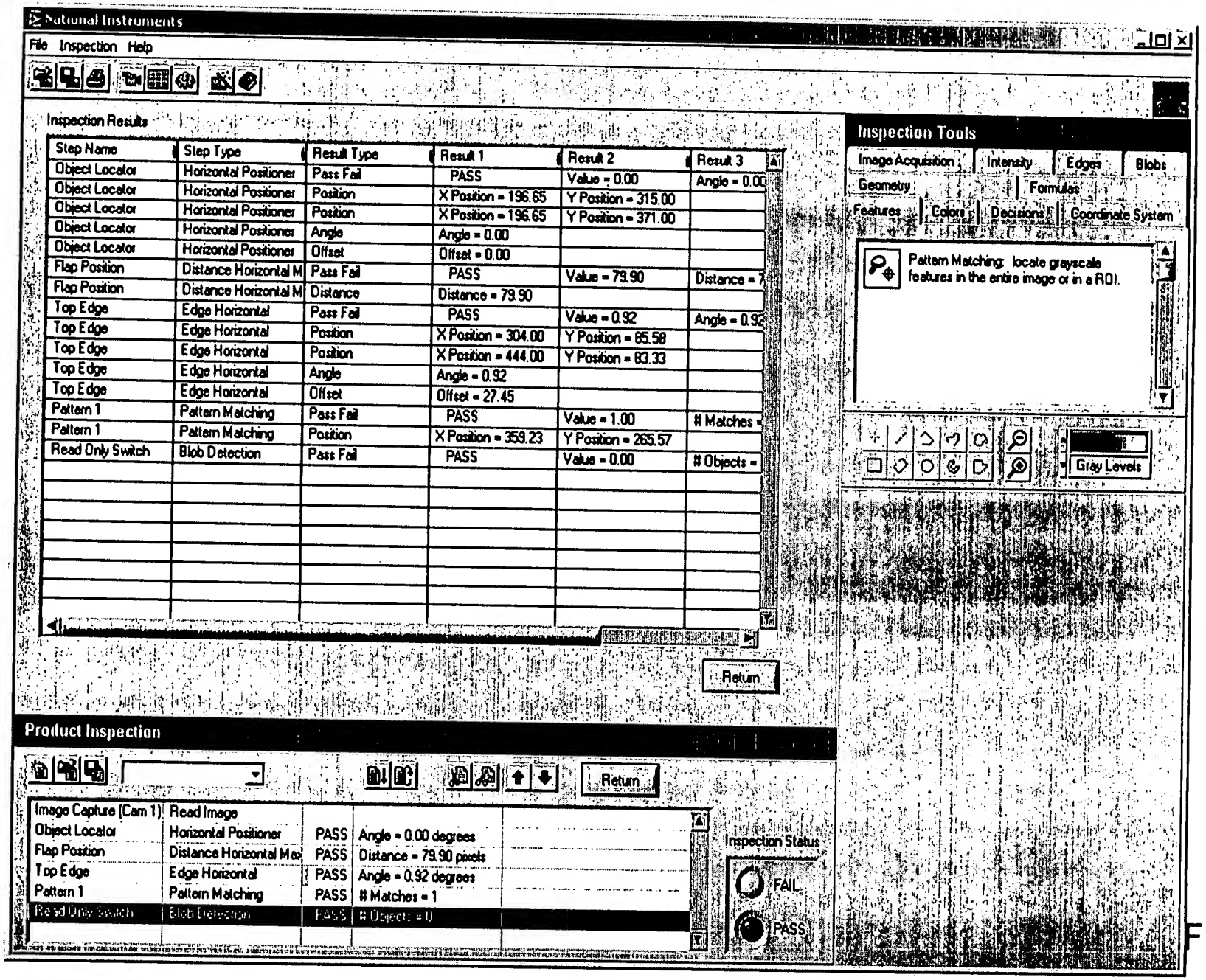
National Instruments
File Inspection Help
Inspection Results
Step Name | Step Type | Result Type | Result 1 | Result 2 | Result 3
Object Locator | Horizontal Positioner | Pass Fail | PASS | Value = 0.00 | Angle = 0.00
Object Locator | Horizontal Positioner | Position | X Position = 196.65 | Y Position = 315.00
Object Locator | Horizontal Positioner | Position | X Position = 196.65 | Y Position = 371.00
Object Locator | Horizontal Positioner | Angle | Angle = 0.00
Object Locator | Horizontal Positioner | Offset | Offset = 0.00
Flap Position | Distance Horizontal M | Pass Fail | PASS | Value = 79.90 | Distance = 7
Flap Position | Distance Horizontal M | Distance | Distance = 79.90
Top Edge | Edge Horizontal | Pass Fail | PASS | Value = 0.92 | Angle = 0.92
Top Edge | Edge Horizontal | Position | X Position = 304.00 | Y Position = 85.58
Top Edge | Edge Horizontal | Position | X Position = 444.00 | Y Position = 83.33
Top Edge | Edge Horizontal | Angle | Angle = 0.92
Top Edge | Edge Horizontal | Offset | Offset = 27.45
Pattern 1 | Pattern Matching | Pass Fail | PASS | Value = 1.00 | # Matches =
Pattern 1 | Pattern Matching | Position | X Position = 359.23 | Y Position = 265.57
Read Only Switch | Blob Detection | Pass Fail | PASS | Value = 0.00 | # Objects =
Return
Inspection Tools
Image Acquisition | Intensity | Edges | Blobs
Geometry | Formulas
Features | Colors | Decisions | Coordinate System
Pattern Matching: locate grayscale features in the entire image or in a ROI.
Gray Levels
Product Inspection
Return
Image Capture (Cam 1) | Read Image
Object Locator | Horizontal Positioner | PASS | Angle = 0.00 degrees
Flap Position | Distance Horizontal Ma | PASS | Distance = 79.90 pixels
Top Edge | Edge Horizontal | PASS | Angle = 0.92 degrees
Pattern 1 | Pattern Matching | PASS | # Matches = 1
Read Only Switch | Blob Detection | PASS | # Objects = 0
Inspection Status
FAIL
PASS

FIG. 15

I02280"6810h660

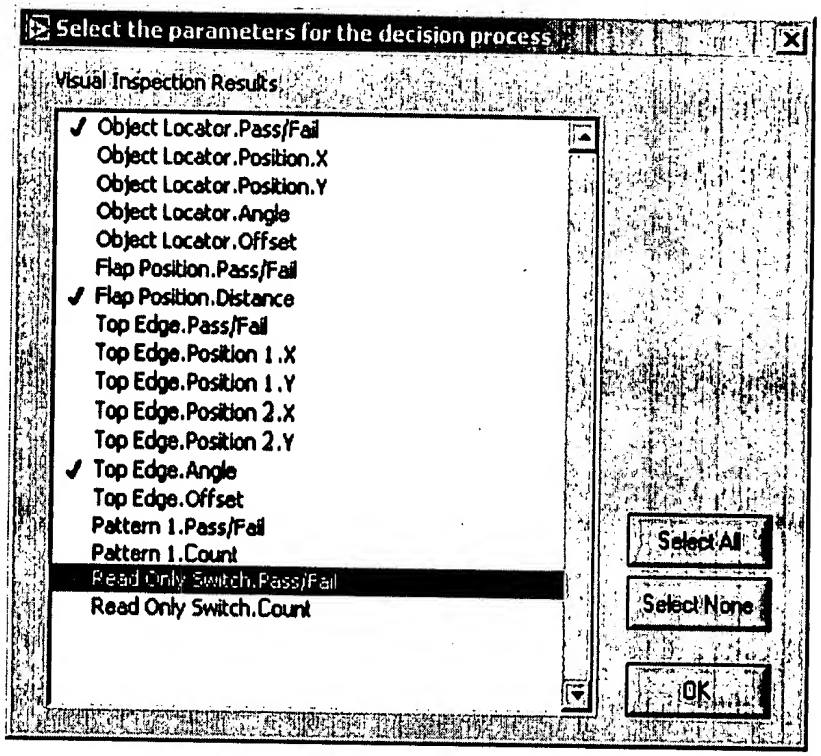

FIG. 16

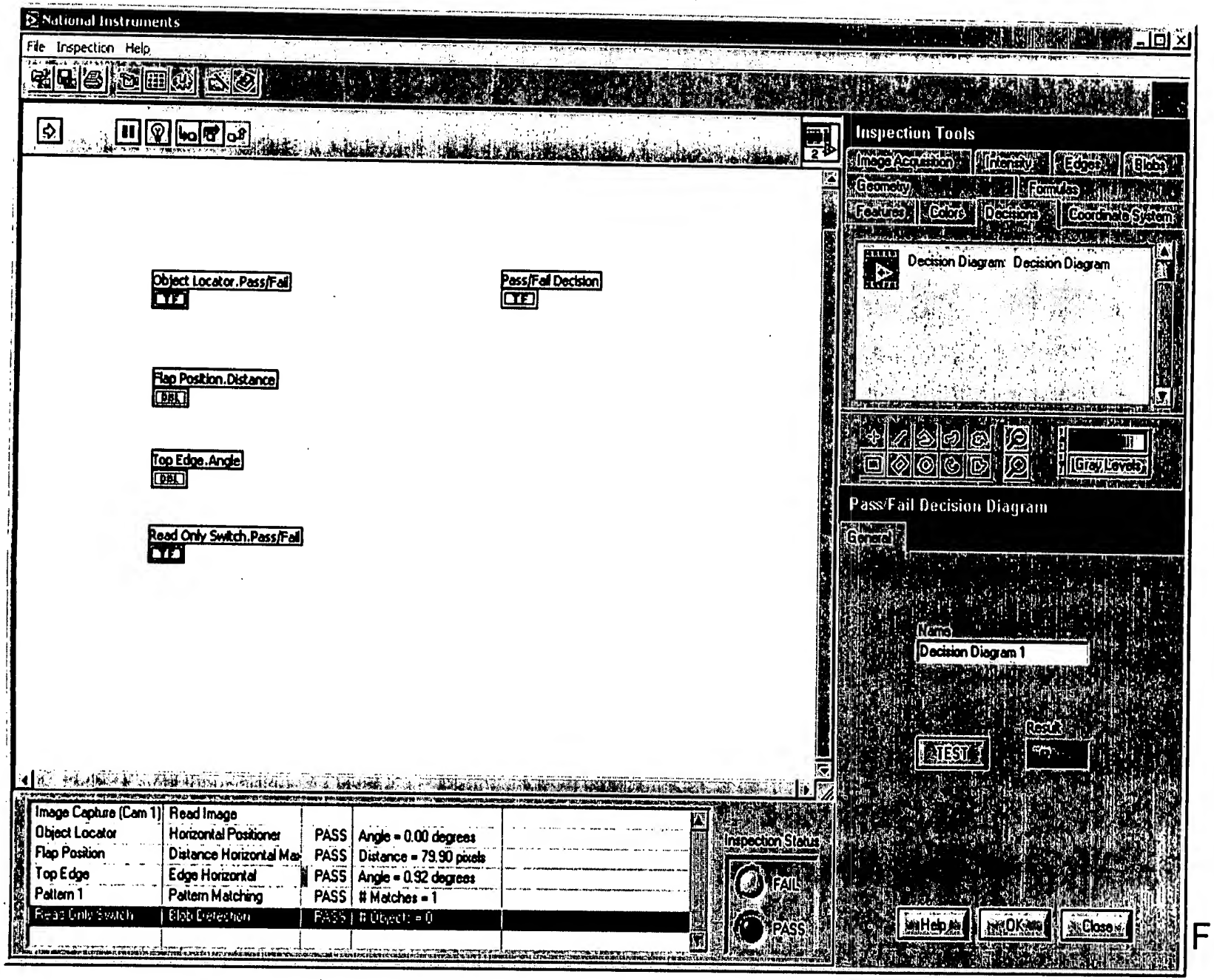
National Instruments
File Inspection Help
Object Locator.Pass/Fail
Pass/Fail Decision
Flap Position.Distance
Top Edge.Angle
Read Only Switch.Pass/Fail
Inspection Tools
Image Acquisition
Intensity
Edges
Blobs
Geometry
Formulas
Features
Color
Decisions
Coordinate System
Decision Diagram: Decision Diagram
Gray Levels
Pass/Fail Decision Diagram
General
Name
Decision Diagram 1
Result
TEST
Help
OK
Close
Image Capture (Cam 1) Read Image
Object Locator Horizontal Positioner PASS Angle = 0.00 degrees
Flap Position Distance Horizontal Ma PASS Distance = 79.90 pixels
Top Edge Edge Horizontal PASS Angle = 0.92 degrees
Pattern 1 Pattern Matching PASS # Matches = 1
Read Only Switch Blob Detection PASS # Objects = 0
Inspection Status
FAIL
PASS

FIG. 17

TO:280*6810h660

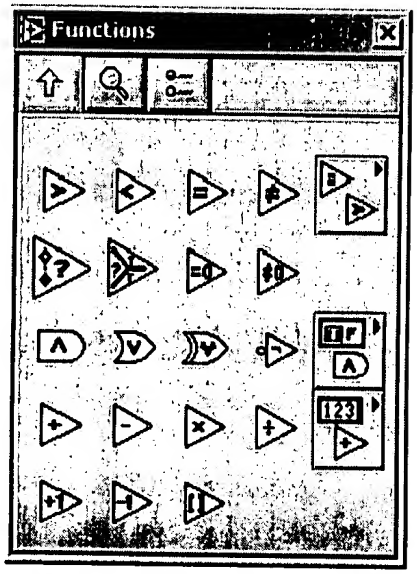

FIG. 18

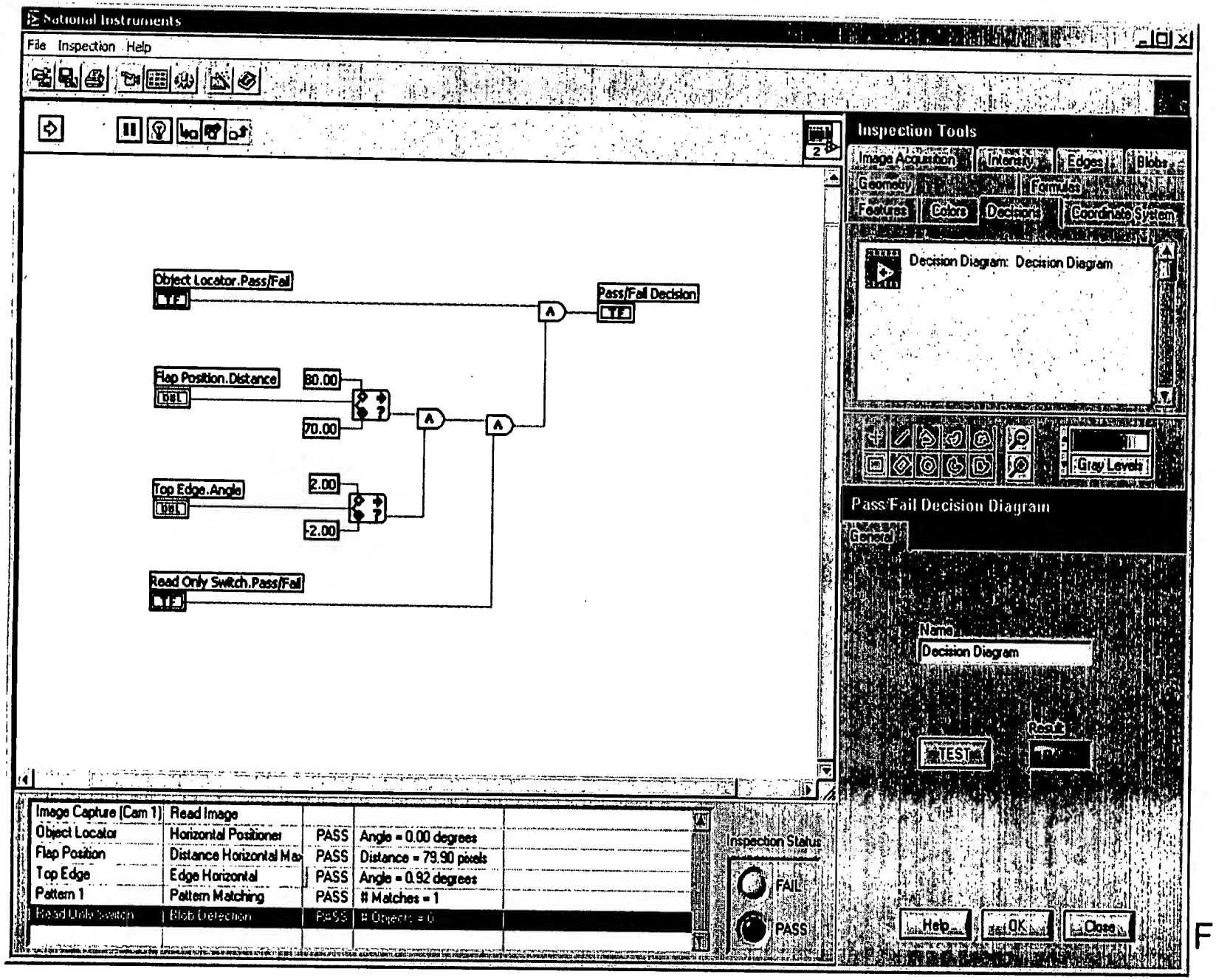
National Instruments
File Inspection Help
Object Locator.Pass/Fail
Pass/Fail Decision
Flap Position.Distance
80.00
70.00
Top Edge.Angle
2.00
-2.00
Read Only Switch.Pass/Fail
Inspection Tools
Image Acquisition
Intensity
Edges
Blobs
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Decision Diagram: Decision Diagram
Gray Levels
Pass/Fail Decision Diagram
General
Name
Decision Diagram
Result
TEST
Help
OK
Close
Image Capture (Cam 1) Read Image
Object Locator Horizontal Positioner PASS Angle = 0.00 degrees
Flap Position Distance Horizontal Ma PASS Distance = 79.90 pixels
Top Edge Edge Horizontal PASS Angle = 0.92 degrees
Pattern 1 Pattern Matching PASS # Matches = 1
Inspection Status
FAIL
PASS

FIG. 19

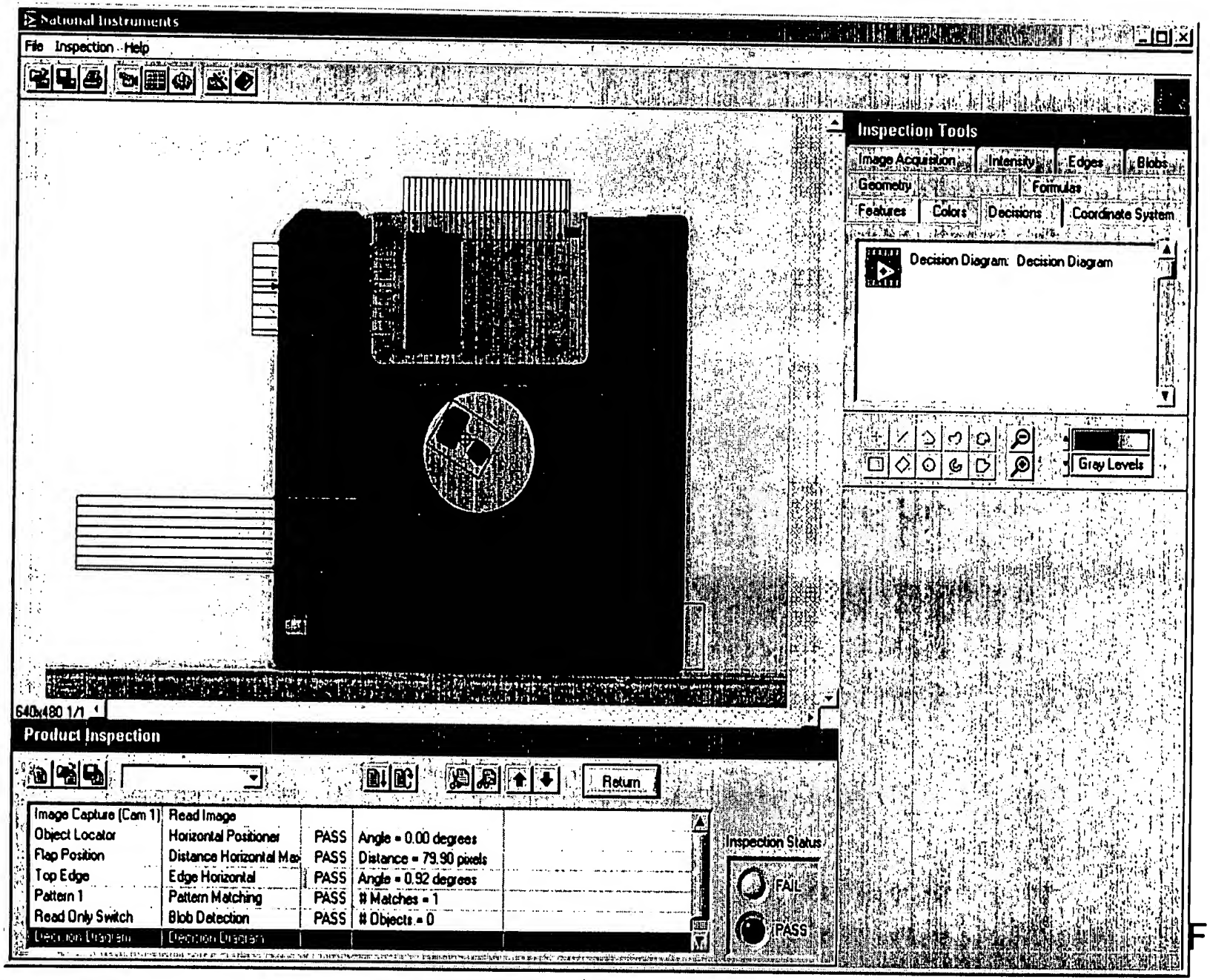
National Instruments
File Inspection Help
Inspection Tools
Image Acquisition
Intensity
Edges
Blobs
Geometry
Formulas
Features
Colors
Decisions
Coordinate System
Decision Diagram: Decision Diagram
Gray Levels
640x480 1/1
Product Inspection
Return
Image Capture (Cam 1) Read Image
Object Locator Horizontal Positioner PASS Angle = 0.00 degrees
Flap Position Distance Horizontal Ma PASS Distance = 79.90 pixels
Top Edge Edge Horizontal PASS Angle = 0.92 degrees
Pattern 1 Pattern Matching PASS # Matches = 1
Read Only Switch Blob Detection PASS # Objects = 0
Inspection Status
FAIL
PASS

FIG. 20

T02280 "68T01660

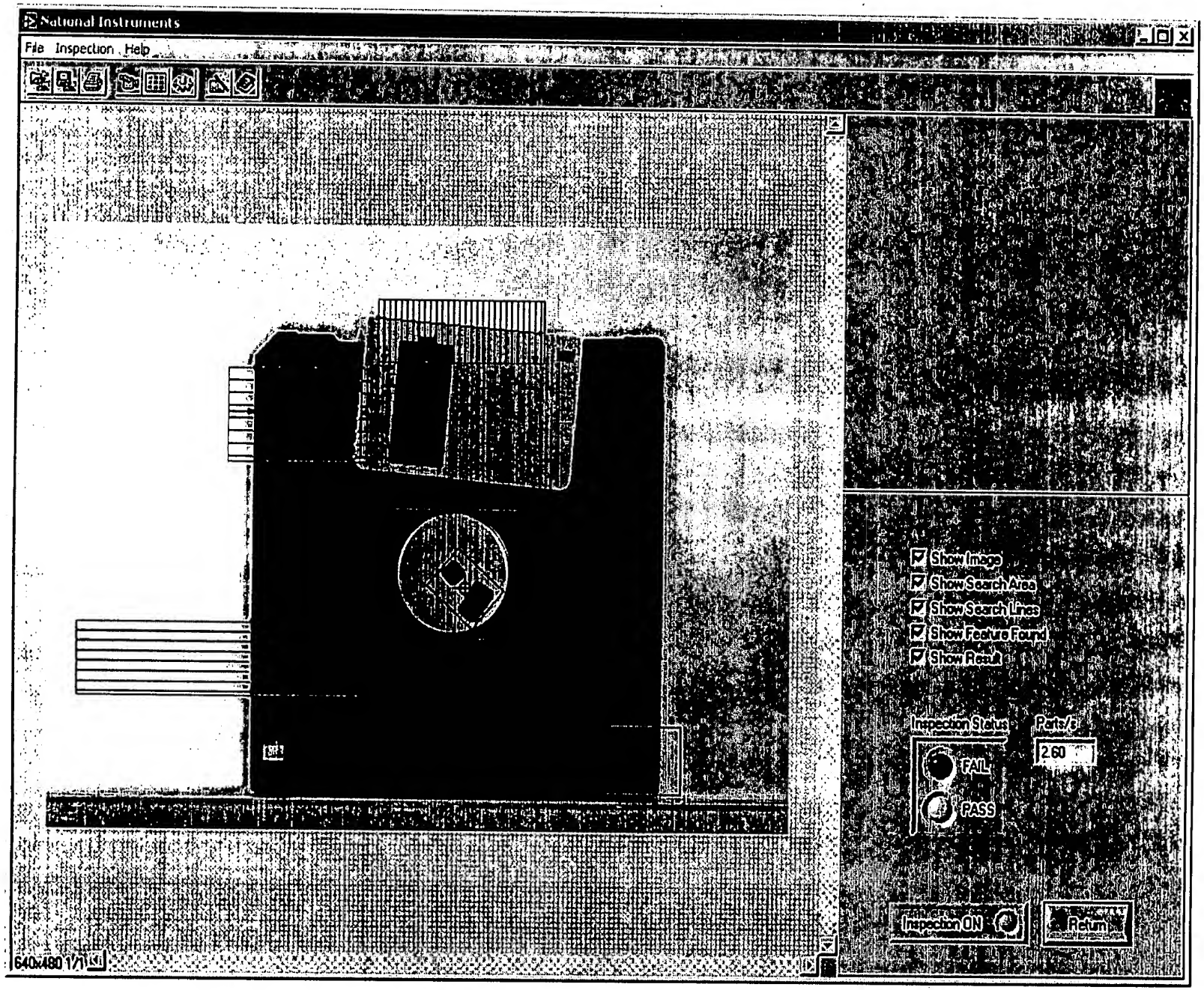

FIG. 21